

WHAT IS CLAIMED IS:

1. A chip-like electronic component having at least its all electrodes formed on one surface thereof, a side wall thereof being covered with a protective material, and  
5 another surface opposite to said one surface fabricated to reduce its thickness.
2. The chip-like electronic component according to claim 1 wherein said protective material comprises either  
10 one of an organic insulating resin and an inorganic insulating material.
3. The chip-like electronic component according to claim 1, comprising a semiconductor chip diced at a  
15 position of said protective material for mounting on a packaging substrate, wherein said electrode is formed on a device surface, and a whole area of said side wall thereof is covered with said protective material.
- 20 4. The chip-like electronic component according to claim 3, wherein a solder bump is formed on said electrode.
5. The chip-like electronic component according to  
25 claim 1, wherein a plurality of a same or different types of semiconductor chips are bonded and integrated by said protective material.
6. A pseudo wafer comprising a plurality of a same or  
30 different types of chip-like electronic components each having at least all their electrodes formed on one

surface thereof, bonded with each other with a protective material coated therebetween, and another surface opposing said one surface being fabricated to reduce a thickness thereof.

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7. The pseudo wafer according to claim 6, wherein said protective material comprises either one of an organic insulating resin and an inorganic insulating material.

10 8. The pseudo wafer according to claim 6, wherein said pseudo wafer is diced into a single semiconductor chip or into a unit of semiconductor chips integrating a plurality of a same or different types of semiconductor chips at a position of said protective material  
15 therebetween for mounting on a packaging substrate.

9. The pseudo wafer according to claim 8, wherein a solder bump is formed on said electrode.

20 10. A method of manufacturing chip-like electronic components comprising the steps of:

pasting an adhesive material on a substrate, said adhesive material having a property to retain an adhesive strength prior to a processing and to lose said adhesive  
25 strength after said processing;

fixing a plurality of a same or different types of semiconductor chips on said adhesive material with an electrode surface thereof facing down;

coating a whole area including said plurality of the  
30 same or different types of semiconductor chips and a gap therebetween with a protective material;

removing said protective material from a side thereof opposite to said electrode surface to a level of a bottom surface of the semiconductor chips;

applying a predetermined process to said adhesive material to weaken said adhesive strength of said  
5 adhesive material so as to peel off a pseudo wafer on which said plurality of the same or different types of semiconductor chips are bonded; and

dicing said plurality of the same or said different  
10 types of semiconductor chips into each semiconductor chip or each chip-like electronic component by cutting said protective material in said gap therebetween.

11. The method of manufacturing a chip-like electronic  
15 components according to claim 10, wherein:

said substrate has a flat surface;  
said adhesive material is an adhesive sheet;  
said plurality of the same or different types of  
semiconductor chip bonded on said adhesive sheet are non-  
20 defective;

said protective material is either one of an organic insulating material and an inorganic insulating material, and is uniformly coated on said semiconductor chips from bottom surfaces thereof to be hardened;

25 said protective material is uniformly ground to a level of the bottom surfaces of said semiconductor chips;

said predetermined process includes irradiating ultraviolet rays on said adhesive sheet through said flat substrate from a bottom surface thereof opposite to the  
30 surface on which said plurality of semiconductor chips are bonded, or applying a chemical solution or heating

the same to weaken said adhesive strength of said adhesive sheet so as to peel off a pseudo wafer having said plurality of the same or different types of semiconductor chips bonded integrally as covered with said protective material, from said flat substrate, said plurality of the same or different types of semiconductor chips bonded integrally on said pseudo wafer being totally non-defective and arrayed thereon with their electrode surfaces exposed; and further

10        said pseudo wafer is diced between said plurality of the same or different types of semiconductor chips.

12. The method of manufacturing a chip-like electronic components according to claim 10, further comprising the steps of: dicing said pseudo wafer at a position of said protective material between said plurality of the same or said plurality of different types of semiconductor chips; and fabricating a single or a unit of semiconductor chips integrating a plurality of a same or different types of semiconductor chips to be mounted on a packaging substrate.

13. The method of manufacturing a chip-like electronic components according to claim 12, further comprising the step of forming solder bumps on said electrodes.

14. The method of manufacturing a chip-like electronic components according to claim 10, further comprising the step of bonding on said substrate said plurality of semiconductor chips which are determined to be non-

defective in a characteristic measurement thereof.

15. The method of manufacturing a chip-like electronic components according to claim 10, further comprising the  
5 steps of: carrying out said characteristic measurement on said plurality of semiconductor chips in a state they are bonded with said protective material; and selecting non-defective semiconductor chips or non-defective chip-like electronic components.

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16. A method of manufacturing a pseudo wafer comprising the steps of:

15 pasting an adhesive material on a substrate, said material having a property to retain an adhesive strength prior to a processing and lose said adhesive strength after said processing;

bonding on said adhesive material a plurality of a same or different types of semiconductor chips with their electrode surfaces facing downward;

20 coating with a protective material a whole area of said plurality of the same or different types of semiconductor chips including a gap therebetween;

removing said protective material from a side opposite to said electrode surfaces to a level of the  
25 bottom surfaces of the semiconductor chips; and

applying a predetermined process to said adhesive material to weaken its adhesive strength so as to peel off a pseudo wafer on which said plurality of the same or different types of semiconductor chips are bonded.

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17. The method of manufacturing a pseudo wafer according

to claim 16, wherein:

said substrate has a flat surface;

said adhesive material is an adhesive sheet;

5 said plurality of the same or different types of semiconductor chips bonded on said adhesive sheet with their electrode surfaces facing downward are non-defective;

10 said protective material is either one of an organic insulating resin or an inorganic insulating material functioning, and is uniformly coated on said semiconductor chips from their bottom surfaces to be hardened;

said protective material is uniformly ground to a level of bottom surfaces of said semiconductor chips;

15 said predetermined process includes irradiating ultraviolet rays, through said substrate, on said adhesive sheet from a side thereof opposite to the surface thereof bonding said plurality of the same or different types of semiconductor chips thereon, or  
20 applying a chemical solution thereto or heating said adhesive sheet to weaken the adhesive strength of said adhesive sheet so as to peel off a pseudo wafer having said plurality of the same or different types of semiconductor chips bonded with said protection material  
25 from said substrate; and thereby

said pseudo wafer having said plurality of the same or different types of non-defective semiconductor chips arrayed thereon, with their electrode surfaces exposed is obtained.

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18. The method of manufacturing a pseudo wafer according

to claim 16, further comprising the step of forming a solder bump on said electrode.

19. The method of manufacturing a pseudo wafer according to claim 16, further comprising the step of bonding on said substrate said semiconductor chips which are determined to be non-defective in characteristic measurements thereof.

20. The method of manufacturing a pseudo wafer according to claim 16, comprising the steps of:

carrying out a characteristic measurement on said semiconductor chips in a state as they are bonded with said protective material; and

selecting non-defective semiconductor chips or non-defective chip-like electronic components therefrom.